## Gleanings from Dartmoor: with Observations on Dr. Verity's Conclusions on Races of British Butterflies.

By G. T. BETHUNE-BAKER, F.L.S., F.Z.S.

To lovers of the West Country the name of Dartmoor is generally fraught with some happy recollection of lovely scene, of breezy health-giving tramps, or of some pleasant expedition in search of nature's more or less hidden treasures, that nevertheless are not so secretly disposed of as to be undiscoverable to those who have a mind to explore and eyes to see. The moor itself is of very considerable extent, being to-day probably not less than 150,000 acres and, as is well known, forming a part of the Duchy of Cornwall. It is a high table-land, intersected with valleys, through which wind some of the loveliest rivers in England; this table-land is more or less surrounded by an outer ring of "tors" of moderate elevation, the highest being High Willhays, of 2,039 feet, whilst Yes Tor, with only a narrow depression between them, runs it very close at 2,029 feet on the northern side; though probably the most conspicuous and certainly the most popular tor is Hey Tor on the southern side. It may perhaps be interesting to some to know that London Bridge is constructed with granite out of this hill. There are of course throughout the whole of the "Forest," as it is often locally termed, numerous tors cropping up all around. The whole district, with the exception of a very small part near the edge, which is of trap rock, is of granite formation, a great chain of granite masses runs through Devon and Cornwall to the Scilly Islands, appearing here and there on the surface; of these Dartmoor is the largest and attains much greater altitudes than elsewhere. Ironstone is found in pockets, but has not been worked to any profit, though one or two tin mines are still in progress, the mines, however, are not up-to-date, and the quantities of ore raised are comparatively small. Very little grain is raised on the moor itself, the greater part of available land being devoted to pasturage.

All around, however, on the edge of the highland, farms abound, and it is evident that they are well managed and prosperous, for the great majority of the farmers are men who seem to be in a comfortfortable position.

It is on the edge of the moor that insect life is most abundant, the villages are numerous, accommodation is easily found, and visitors are generally well catered for. Having family connections within sight of the southern heights, I have for the last thirty years been in the habit of visiting the district annually, often several times a year. This year, alas, through travelling restrictions coupled with an invalid household, circumstances have prevented my going down, so it is well to recall some happy reminiscences of the past and to live in hope of the position being more favourable next year; for those who know the West Country learn to love it, and in the busy times of city life often long for its peace, its beautiful scenery and delicious air.

Last year I was with my family at a little place called Bovey Tracey on the south-eastern edge of the moor; we were four miles from the more or less isolated peak of Hey Tor that I have already mentioned,—and were in the Devon pottery district, and in the midst of regular Devon surroundings, the lanes and heaths being quite typical. On the one side we have a considerable extent of heather

downs, on the other a narrow belt of comfortable farms ascending up to the high plateau of the moor proper. The little village of Manaton, a very favourite spot of mine, is about four or five miles to the north-east, whilst Lustleigh, famed for its weir and deep gorge, is also not far distant in a more westerly direction, being nearly due west of Manaton; all the country is rich in waters and streams in all directions.

My entomological aims were to obtain certain common insects with the object of verifying some of Dr. Verity's conclusions that appeared in this magazine in the year 1916. Among them being *Pieris napi*, *Melanargia galathea*, *Satyrus semele*, *Pararge aegeria* var. *egerides*, and others. *P. napi*, I think, will require a short paper to itself and I have not yet sufficient material from different parts of this country to enable me to verify my previous opinion or to negative it as the case may be.

*Satyrus semele*, L. was very common on the heath within a quarter of an hour's walk of our rooms and I took close on a hundred specimens in good condition. I had already specimens I had taken in Cornwall, other parts of Devon, and in Wales. I have also a fair series from Kent and Sussex, from Ireland and Scotland, so that one can form a fair idea of the relation of the British race to the Continental forms.

When Linné catalogued this species in the 1st Ed. *Fauna Suecica*, p. 238, No. 784, he gave four general references, *viz.*, *Hoffn. Ins.*, 2, t. 8, *Pet. Mus.*, p. 34, No. 307, with a brief diagnosis, *Pet. Gaz.*, p. 22, t. 14, f. 9, and *Raj. Ins.*, 128, No. 6, with a less brief diagnosis, and he himself describes it above thus "wings above brown with obsolete yellow fasciae." From all this I conclude that we should consider the ordinary mid-European race to be the form that Linné had in his mind's eye when he described it. The obsoletion of the yellow fasciae, particularly in the primaries of the males, occurs throughout its distribution, except in the races *aristaeus* and *algirica*, and even in *aristaeus* there is a certain amount of obsoletion in many Italian specimens. The darkest race of all is that described and figured by me in 1891 (*Trans. Ent. Soc.*, p. 202, pl. 12, f. 2) from Madeira and called *maderensis*—there is no trace of a fascia in the primaries of the male and only the most obscure trace in the secondaries. I have a moderate series from Madeira and all carry this character.

Turning now to Dr. Verity's remarks *ante* Vol. 28, p. 166, his opening words are, "The Linnean race is a small one," etc. It is evident from this that he considers the Scandinavian race as the one Linné diagnosed in his *Fauna Suecica*, but in that work he refers to four well-known books of that time, in two of which the species is figured and in two of which diagnoses are given, which diagnoses he transcribes. In his (Linné's) collection there is (*fide* Dr. Verity) only one Linnean specimen, by which I think he means Scandinavian specimen, because there are others as well, and under the circumstances I have related it is perfectly evident that Linné's *semele* is a composite race, whose main habitat may be called mid-Europe. Typical *semele* therefore cannot be limited to the smaller more northern form. Dr. Verity is certainly correct in saying that the British race belongs to this rather smaller race wherein the fulvous spaces are inconspicuous;

the obliteration of these spaces is, however, only confined to the area between the two ocellations in the primaries, and even here it is very variable, for the fulvous yellow marks are nearly always quite prominent around those spots, this obliteration, however, occurs in all the races I am acquainted with except true *aristaeus* and *algirica*. I have *semele* from many parts of Switzerland, France, and elsewhere, and they are always decidedly larger than British specimens. The form found at Bérisal is, I think, the handsomest of the typical (Mid-European) race that I know; some years ago I took a nice series there, both sexes are large, I might say very large, the male is very dark in both wings and in the primaries has the fulvous edging reduced to a minimum and is without any of that colour between the spots, whilst in the secondaries the fulvous spots are reduced to the wedge-shaped spots Dr. Verity refers to in his form *bipicta*; in the female the tawny area is large in both wings, brilliant in the secondaries but paler in the primaries, and in the latter the ocellated spots are extraordinarily large and very deep black. The race from the Eastern Pyrenees approaches somewhat the Algerian race, but is greyer and not quite so large and bright.

*Bipicta*, Verity.—It would be difficult to say where this form begins or ends, the characters given are so very variable. The extreme form is very pretty and easily recognisable but, in a fairly long series, it would be quite easy to pick out a series of absolute gradations; in the female it is rare, but occurs occasionally. It appears to occur throughout the distribution of the species. I have it from Switzerland, from the Pyrenees, from Germany, and from Ireland.

*Scota*, Verity.—I have been unable to obtain this variety. I have specimens from different parts of the North of Scotland, but have as yet seen none with the fulvous area at all large. I conclude, therefore, that its locality is extremely limited. In all my Scotch specimens there is a tendency to lose the white fascia on the underside of the secondaries and for the tone of colour to become more uniform. My Digne specimens do not show much increase in the vividness of their coloration, neither does a nice little series that I have from the Eastern Pyrenees.

I am rather surprised to notice Dr. Verity's remark that African specimens get smaller and have reduced tawny areas. I have perhaps a dozen Algerian examples, all of which are of large size, with very conspicuous fulvous areas.

It may be of interest here to give some observations I have made on the pairing habits of this insect. In several cases I noticed the females invariably carried the males; their courtship, however, is quite interesting. I had the good fortune to observe it twice this summer. The first case I noticed was on a high road, on one side of which was the mountain side and on the other a stretch of about 5 ft. high close wooden fencing, as a protection against a steep almost vertical cliff going right down possibly some 200 or more feet into the sea. The male scented the female and at once accosted her, when she settled immediately on the wooden fencing, the male alighting almost beside her; a momentary caressing with the antennæ was a prelude to a rapid change of position, the male then taking up a "tête-à-tête" attitude, not quite close, but possibly half an inch away, when the antennæ immediately came into play again, both of which stroked and

tapped those of the female, as also the base of her wings; this lasted for some time, perhaps from 10 to 20 seconds, the play of the antennæ being incessant but deliberate, when suddenly his proboscis elongated and he seized hold of apparently the head and an antenna of the female and at the same instant was at her side endeavouring to grasp her abdomen with his prehensors. He failed, and was in a moment face to face with her again, when precisely the same performance took place, though he never again seized her with his proboscis, but quite suddenly (having satisfied himself, I suppose, that his attentions were not unacceptable) assumed the position alongside. Again he was unsuccessful; this time, however, he seized the margin of the lower wing, and without a moment's loss of time he was in front of her again, when the same thing took place; this happened over and over again, but he never succeeded in clasping her, and I noticed several times that she moved her abdomen away, as far as I could see, in a lateral direction rather than an upward one, though I could not be certain, as with the ample secondaries of the female and her rather short abdomen, it was very difficult to see the exact action. The curious part of it to me was that she apparently accepted his attentions at all, only once did she fly away, and then for scarcely a couple of yard's distance, and she seemed by no means unfriendly. The male was quite freshly emerged, but the female must have been out for days, as she was much rubbed and a little torn. In the other instance a similar procedure was gone through except that I did not see the extension of the proboscis, and in that instance the first attempt at copulation was successful.

*Melanargia galathea*, L.—I regret to say I find it very difficult to follow Dr. Verity in his remarks on this species (*ante l.c.*, p. 130), particularly for two reasons, the first being that he desires to make the single Linnean specimen, as he calls it, though there are two such specimens, a sort of type which it is impossible to do when the situation is reviewed; and the second reason is—his inference that the British race is his pale race *serena*, whereas my experience is that the great majority of our British specimens are as dark as the ordinary run of specimens from Switzerland, Germany, and elsewhere. I have taken the insect at Heidelberg and other parts of the Rhine, and they present absolutely no differences from those found in our own islands.

Let us first consider the question of the type. Linné described the species in the 10th edition of the *Systema Naturæ*, and Dr. Verity says that he gives Germany and the southern parts of Europe as the habitat, but he omits to note that he gives as his last reference Wilkes *Butterflies*, with its figure. This shows he knew of its occurrence in England, even though he only gave Germany and southern Europe as the habitat, and it probably means that he had seen the other specimens but had not seen British examples. In the Linnean collection there are five specimens, two of them having continental pins, one of which appears to be labelled by Linnæus. I should say that both of these are Linnean specimens, none of them can be considered to belong to the form *procida*, though one of the two is larger and somewhat darker than the others, the series seems to me to be typical of the ordinary run of British examples, excluding the pale form *serena*, Verity, from Derbyshire. I have taken the species, I was about to say, from all over England and Wales, but that would be an exaggeration, but I

have taken it from very many localities. I have long series of it from the Isle of Wight and various parts of Devonshire, and shorter ones from Cornwall, Kent, many parts of Wales, and Dove Dale—which last are certainly not *serena*. I have it from the York Wolds and elsewhere, all, however, are of the same type, rather smaller than what we may call the Mediterranean form, but fully as large, if not larger, than my captures of the species at Digne, the Cevennes, or the Pyrenees, or in the Engadine, at lower altitudes, such as Alvaneu Bad, etc., whilst a few specimens I took at Baveno, on the Lake of Maggiore, are no larger than my British captures, though they are decidedly darker. I am therefore compelled to form the conclusion that *serena* is very rare, at all events in these isles, and that our ordinary form is the *galathea* of Linné.

But to go back to Linné's description, Dr. Verity says (*ante l.c.*, p. 131) that Linnæus "actually states that there are no ocelli on the upper side." I have looked in vain in the original description for this statement. I suppose the remark Dr. Verity refers to is this, "Ocelli, in pagina inferiore tantum, obsoleti." This is a totally different thing to saying there are no ocelli on the upperside, and in a brief diagnosis of this kind, means no more than that whilst on the underside they, the ocelli, were an evident character, on the upperside they were not an evident character; that is certainly what I should infer from such a description in brief, and it would apply to the vast majority of specimens that I know, in nearly all of which the ocelli of the upperside have to be sought for, and would not be likely to be mentioned in the brief diagnosis Linné always adopted. It might be well to state that the question of the possibility and advisability of considering the specimens contained in the Linnean collection as types was most carefully considered by our National Nomenclature Committee for Entomology—a committee composed of men of very different opinions and standpoints—and that body unanimously came to the conclusion that it was neither possible or advisable. Many reasons were evident, but one alone I think was sufficient, *viz.*, that it was quite impossible to know whether his descriptions were drawn up from specimens or from the various books he referred to. "Types," as we understand them, were certainly unknown in the time of Linnæus, and I do not think it is reasonable, nor yet scientific, to ask us working entomologists to adopt as *typical* of Linnean species the specimens that are in the Linnean collection. In making this statement I do not for a moment suggest that Dr. Verity is not scientific, very friendly correspondence with him proves him to be a most accurate and minute observer, but this is a point that I rather think he has probably overlooked.

*Pararge aegeria* race *egerides*, Stgr.—Since Dr. Verity's observations appeared (*l.c.*) Dr. Perkins, and also our late friend Mr. Gibbs, have both written very interesting papers on the species. I have an intimate acquaintance with it in Devonshire, and to a less extent in other districts also, but I believe I have only taken a single specimen of it on the continent, and that was many years ago at Heidelberg, a lovely spot of happy recollections, but never to be visited again by me; for after the present catastrophe I do not desire to see either a German or his country any more.

My observations confirm Dr. Perkins entirely so far as the May and June and the summer broods are concerned. I am never able to

visit Devon in March and April, and therefore I cannot speak of the brood that hybernates as pupæ, the later spring brood and the summer brood are very closely similar in colour and pattern. The April New Forest form, however, entirely agrees with Dr. Perkins' hypothesis, it is decidedly paler above, and the spots are larger and paler, giving the insect an altogether lighter appearance, which contrasts markedly with the September emergence. I have found the species by no means uncommon at Lyndhurst in that month, and it approximates quite closely to the Devon late August examples. I was at Bovey last year during July and the first part of August, and I took one specimen on July 6th and another on July 11th, both somewhat worn—these were evidently late stragglers—both were females—from the May and June brood, then came a gap, and on July 21st I took a fresh male, then followed another gap, and on July 30th the summer emergence began thoroughly.

I have taken the species in the Cotswolds, Wales, and elsewhere, and I agree that on the whole our form is slightly, but very slightly, smaller than the German race with the pale spots, which spots are on the whole slightly smaller. The Irish race, *pallida*, Tutt, of which I have a fair series, is very decidedly greyer and paler than the form I have been speaking of and the spots are larger and paler. On the underside there is also a marked difference between the early first emergence and the summer one, the hindwings have the median fascia entirely filled in with dark colour and are generally richer in tone than the late spring and summer emergences; this character also applies to my Lyndhurst examples, the early spring specimens being very pretty indeed. I have a nice series sent me by my late regretted friend Frank Lowe, from Guernsey, and these form a pretty, not half-way house but perhaps a third of the way, towards the Mediterranean true *aegeria*, they are smallish, if anything under the size of the British race, but with the pale spots much more ochreous, and the brown colour much browner and darker, the ochreous spots are also larger than in our island forms.

*Pararge megera*, L.—I have not been able to secure specimens of Verity's form *caledonica*, but my friend says most of our specimens are transitional to it; the species is a common one in both its broods throughout Devonshire and it is quite abundant around Dartmoor. I have been comparing these, as also numerous specimens from Wales, with those I have taken on the Continent. I do not happen to have any from Central Europe, but between those I have taken in Switzerland, at Digne, and the Pyrenees, both "Orientales" and "Hautes," the differences are practically nil, if I were to mix up specimens I have from Digne, the Pyrenees and Èclepens, with any Devonshire or Welsh series, I could not separate them except by their labels, the marginal band, the androconial streak, and the other characters are identical. The suffusion with black scales of the under-surface is largely, I believe, a question of freshness. I have a nice series from Torcross in which they are quite absent, and many from Devon are similarly wanting, whilst a very fresh series from Criccieth, N. Wales, have these scales quite prominently; on the other hand, however, it is to be observed that specimens from Aosta and from Geneva have a considerable suffusion thereof.

*Epinephele jurtina*, L.—I have been unable to ascertain whether

either ab. *pauper* or ab. *nuragi* forms occur in England, they do not in my collection, but then I have only a small series, not more than sixty or seventy, and this number is quite insufficient to enable me to judge; neither have I any ab. *anommata*, but my series of males is much smaller than of females—males of this species have for some reason never appealed to my sense of beauty. I took a very pretty female last year at Bovey in which the fulvous patch of the primaries is entirely replaced by very pale straw colour, the underside being also similarly affected. I have also a large male from Dartmouth with a distinct tawny patch on the primaries below the ocellus, from the general appearance it is not improbable that this may be a gynandromorph; I shall dissect it shortly, I hope.

*Pyronia tithonus* race *britanniae*, Verity.—When Dr. Verity is speaking of the ocelli in this species he is evidently referring to the underside and I am constrained to think a slip has occurred, as he says, "the number of ocelli tends to increase, as many as five on the forewing and three on the hindwing may exist."* I think it should be three on the forewing and five on the hind. This is quite correct, and I have specimens with as many as six on the hindwing, but three on the forewing, though occasionally present, is really rare. I quite accept Dr. Verity's racial name, our island form is decidedly handsomer and more highly coloured than the general run of continental specimens. I have devoted special attention to this insect and have taken a considerable series in the last three years from different localities.

*Aphantopus hyperantus*, L.—This species occurs all over the moor, even on some of the exposed districts. There is nothing to be added to Dr. Verity's summary.

*Coenonympha pamphilus*, L.—I think Dr. Verity is quite right in separating out *lyllus*, Esper, from this species. I am now preparing genitalia mounts and rather expect to find them showing specific divergences. The Asia Minor form (and I suppose the Greek race, but I have no specimens from that country) called by Rühl *marginata*, is quite worthy of the name. I have a good series from Brussa and also some from the Caucasus, the very broad and dark margins to both wings and the larger distinct black apical spot render the form recognisable at a glance, the underside is variable, some specimens being transitional towards *lyllus*, others being very dark and true *pamphilus* in their coloration; the underside of the Caucasian specimens is very dark and they certainly belong to the Linnean species. I have not sufficient examples of Verity's *australis* from the South European localities to judge whether they are really at all constant in their pattern or not, the few I have are variable, but I must own I am sceptical as to the need of giving our British race a varietal name.

To come back now to the theme I started with, to wit, Dartmoor and its lovely neighbourhood. Last year I spent some time, July and part of August, at Bovey Tracey, and from there I walked far and wide; I remember being surprised when I was on the top of Hamel Down, a very bleak spot, to net a nice female *Celastrina argiolus*, of course the second brood, but it was a long way from its natural food-

* Mr. Wheeler, who has been studying this species lately, tells me there may be four spots (counting the double one as one) both above and below on the forewing and five above and seven below on the hindwing.—G.T.B.-B.

plants, and it was a calm beautiful day, and so it could not have been blown up there, but there it was until it found a home in one of my boxes. On July 1st we had a wet morning, but the sun shone out well in the afternoon, though the foliage was still much bedewed, when on my way back from posting letters what should fly past but a *Colias edusa*. Naturally, I ran after it, and there settled on a bramble was a lovely quite fresh specimen, from its absolute spotlessness I should think it was in its first flight; it was however the only one I saw. All the three "whites" were common, *napi* especially so, and of this I took a large series of the second brood. There is considerable variation in these, more particularly so in the undersides. I am still accumulating specimens of this insect when I can, the important thing being to get series of both broods from the same locality. It will be interesting perhaps to observe that I saw several copulations of *napi*, and in each case the male carried the female in flight. *Melanargia galathea* was very common in one small area, but its habitats though wide-spread, are very circumscribed. The whole of the *Argynnidae* are to be found in the neighbourhood, and I think the *Melitaeae* also. *M. aurinia* is not uncommon within half an hour of my rooms in the proper season, and even in July I took one very worn specimen. *M. athalia* is also to be found in the district. *Brenthis selene* and *B. euphrosyne* are always in evidence, whilst the three large species are common, and *Dryas paphia* and *Argynnis cydippe* (*adippe*) are extending their range from the valleys and more sheltered spots even on to the moor itself. I was able to confirm observations of others as well as my own as to the copulating habit of *paphia*, for I saw the male carrying his mate several times; with *aglaia*, on the other hand, the female carries the male; I saw two instances of this. I was able to make extended observations of the egg-laying of *D. paphia*. In the cases under my notice they were always laid on the common bracken fern, sometimes on the fronds, but sometimes on the stem. I followed down one female in a lane and saw her settle in the hedge, creeping well in, but as it was fairly open I could see her well. She approached some bracken, feeling about with her in-turned abdomen she tried several stems before making her selection, one broken stem (not bracken) she spent much time over, but finally found one to her liking and laid a single ova low down on the stem, perhaps four or five inches from the root, then she flew out and preceeded to another spot and did likewise. Where there are large areas of the fern, however, such as Lustleigh Cleave and down by the weir, they settle on the fronds and bending their abdomen underneath deposit an egg below. I do not remember to have seen them deposit two ova at the same time, and where two are discovered together I should suppose them to come from different specimens. *Aglaia* is common all over the moor even in the most exposed parts. Another species common in all the less exposed lanes, but rarely seen on the high roads, is *Aphantopus hyperantus*, but I have rarely taken any but the common form. Turning to the *Lycaenidae*, *Bithys quercus* is to be found in all localities around the edge of Dartmoor and also on the moor itself in sheltered spots, generally flying in the sunshine, but I twice found specimens on the ground; on one case, after a shower I was taking an evening stroll and saw one on the road with wings outspread, it allowed me to box it without trouble and was quite unharmed and a good specimen, I

suppose the shower may have disturbed it. In like manner the only specimen of *Strymon w-album* that I have taken for years in that district was one taken about 6.30 p.m., after a very hot day, on the ground beside a bridge over one of the small tributaries of the river Bovey, but in this case I think it must have come down to drink as it was settled in the proper butterfly resting attitude. *Ruralis betulae* occurs more or less all over the district. I have taken and bred larvæ from blackthorn from some of the most exposed parts of Dartmoor, such as Post Bridge and elsewhere. *Polyommatus icarus* is not common, so for as my experience goes, but is very wide spread. *Plebeius aegon* (*argus*) is very common in its own localities and suffused blue females often occur, one pretty little specimen is of the radiate form and has on the secondaries a series of saggitate submarginal blue marks. The second brood of *Rumicia* (*Heodes*) *phlaeas* turned up on August 1st, one specimen having very large spots. *Celastrina argiolus* is to be found throughout the district, though last year I only took four examples, three females and one male.

Much was said last year (1917) on the abundance of *Vanessa io*, my own experience confirms this also; I do not remember to have seen such large numbers before. It is a beautiful object in the sunlight, and its black marbled underside is sometimes very striking.

*Epinephele jurtina* and *Pararge megera* I have already referred to, both are common throughout the neighbourhood.

Of the *Hesperiidae*, the commonest so far as my experience goes is *Adopaea flava* (*thaumas*), Hufn., this species being very abundant. *Agriades comma* is also by no means rare.

Of the *Heterocera* I have a very limited personal experience, as I have never been able conveniently to sugar, owing to my being always with nonentomological friends or relations, and most of my captures have been day-flying species or have come in to light—last year this was fairly successful, and it is very interesting to watch the comportment of the different species. *Malacosoma neustria* dashes about in the wildest fashion until apparently tired out, when it settles and must be bottled immediately; only males visited me, among them, however, were two very pretty pale ochreous specimens. They are, however, very variable in the tone of colour. *Cosmotriche potatoria* flies wildly about the room and must be caught with a net, though they will occasionally settle for a few minutes, though only to begin again very soon with their mad dance. *Anarta myrtilli* was very active at first, but soon settled down quietly. One *Prothymnia viridaria*, a very dark specimen, put in an appearance, and though not very active was very restless and required several attempts to box it off the ceiling. *Bryophila perla* was also fairly quiet after the first short excitement, and was a frequent intruder. Both sexes of *Crocallis elinguaria* put in an appearance and danced about very excitedly indeed, and two specimens of the 20 plume moth were likewise attracted, as also were single specimens both of *Hypena proboscidalis* and *Aphomia sociella*. *Hydroecia nictitans*, a very fresh and brightly coloured specimen likewise paid me a single call and made its home in my cabinet, whilst *Leucania pallens*, as was to be expected, paid many calls. Of the other *Leucaniae*, *L. litharggyria* was quite the commonest, but only one very worn *L. conigera* turned up. Two *Caradrina* (*Athetis*) *alsines* and one *Miana strigilis* came, whilst of the *Pyralidae* two specimens of *Pyrausta purpuralis* were very

lively. One or two Geometers were attracted in like manner, the most noteworthy being *Geometra papilionaria* and *Selenia illustraria*.

Turning to the day-flying moths. I have dealt with *Zygaena trifolii* more than once, it was perhaps remarkable for its entire absence at Bovey Tracey, but *Z. filipendulae* was common on the road sides, among the broad grassy edgings; at the end of July I visited an old locality near Manaton for *Z. trifolii*, and found it nearly over. I took, however, two curious aberrations, one with the spots on the left side of the primaries straw colour, and the wing itself brownish, and the other quite symmetrically marked, with the fifth spot entirely straw colour, as also was the lower part of the lower median spot of the primaries and a little straw coloured patch at the anal angle of each secondary—the outer half of the primary had quite lost the usual bronze hue. Whether this can have been due to damp, or whether it is defective coloration, I am unable to say, though I must admit we had very little rain indeed in that part of Devon in 1917. *Callimorpha dominula* was common among some willows that surrounded a small mine that had been obtained and worked by Germans until the outbreak of the war. It was very fond of soaring high up in the air in the brilliant sunshine. I picked up a single fine ♀ of *Arctia caja* in a hedge row. Larvæ did not appear to be abundant, but on some willows a mile below Hey Tor rock *Dicranura vinula* were in great plenty. Generally speaking, Devon is fairly rich in Heterocera, and some of our best *Noctuidae* are to be taken within its borders, but these latter are not to be found in the immediate neighbourhood we have been considering.

## Insects collected in Salonica district in 1917 and 1918.

By Capt. GEO. S. ROBERTSON, M.D., R.A.M.C.

Mr. Norman C. Preston has collected most of the following insects in this locality, and I have added a few to his list. He has had them identified by the Imperial Bureau of Entomology, British Museum (Nat. Hist.). We thought it would be of interest to publish the list. All were found within a five mile radius of Salonica.

Diptera.—*Bombyliidae*: *Exoprosopa jucchus*, F.

Coleoptera.—*Carabidae*: *Carabus cerysi*, Dej., *Calathus punctipennis*, Germ.

*Meloidae*: *Cerocoma schreberi*, F.

*Copridae*: *Copris hispanus*, L.

Cetoniidae.—*Epicometis hirta*, Poda.

*Melolonthidae*: *Elaphocera gracilis*, Watt. One ♂, new to British Museum.

Lamiidae: *Agapanthia cynarae*, Germ.

Hymenoptera.—Apidae: *Eucera tuberculata*, F.

*Formicidae*: *Myrmecocystus viaticus*, F., *Lasius umbratus*, Nyl., ♀, *Aphaenogaster barbara*, L., ♀.

Ichneumonidae.—*Paniscus opaculus*, Thoms.

Planipennia: *Myrmeleonidae*: *Creagris plumbeus*, Oliv.

Nemopteridae: *Nemoptera sinuata*, Oliv.

Rhynchota: *Pentatomidae*: *Dolycoris baccarum*, L.

*Cicadidae*: *Cicada atra*, Oliv.

Orthoptera.—*Mantidae*: *Empusa fasciata*, Br.